

REMARKS

There remains pending in this application claims 1-20, of which claims 1 and 11 are independent. No claims have been added or cancelled.

In view of the above amendments and the following remarks, favorable reconsideration and allowance of the above application is respectfully sought.

Applicant's invention as now set forth in independent claim 1 recites a heater drive circuit comprising a full-wave rectifying means for full-wave-rectifying an AC power supply, current detecting means for detecting a current supplied from the AC power supplied to the full-wave rectifying means, a switching converter for converting the full-wave rectify voltage from the full-wave-rectifying means into a voltage supplied to a heater to be driven and voltage detecting means for detecting the voltage applied to the heater. There is further provided heater control means for controlling the switching converter on the basis of the current value detected by the current detecting means and the voltage value detected by the voltage detecting means.

Independent claim 11 also recites a heater drive circuit and has been amended substantially the same as claim 1. Claim 11 more specifically recites a voltage detector and a heater control unit in lieu of the voltage detecting means and heater control means of claim 1.

Independent claims 1 and 11 were rejected under 35 U.S.C. § 102(b) and other subparagraphs of § 102 as being anticipated by either Okabayashi et al. (U.S. Patent No. 6,037,576), Matsuo et al. (U.S. Patent No. 6,930,293), or Kinouchi et al. (U.S. Patent No. 6,868,249). In view of the above amendments and the following remarks, the rejections are respectfully traversed.

The invention as featured in each of independent claims 1 and 11, and thus the

claims depending therefrom, is now characterized at least in its (1) detecting a current supplied from AC power supply to the full-wave rectifying means, (2) detecting a voltage applied to the heater, and (3) controlling the switching converter on the basis of the current value detected by the current detecting means and the voltage means detected by the current voltage detecting means. By virtue of this combination of features, the precise amount of power supplied to the heater can be controlled.

More specifically, the switching converter is controlled so that a current supplied from the AC power supply based on the voltage detected by the current detecting means does not exceed an upper limit value. In addition, there is generally a problem in which the power to the heater unexpectedly varies as a result of variation of a voltage of the AC power supply due to the AC power supply being supplied directly to the heater of the fixing device. In accordance with this invention, the voltage converted by the switching converter is applied to the heater and the voltage applied to the heater is detected. If the resistance of the heater is constant, the power to the heater is proportional to the applied voltage. Because the switching converter is controlled, the power supplied to a heater can be precisely controlled despite variations in the voltage of the AC power supply.

Okabayashi et al. features an electromagnetic induction heating circuit.

Okabayashi et al. specifically discloses a circuit 28 which detects voltage in a coil and a circuit 29 which detects a current rectified from the AC power supply current in a resonance circuit to supply an alternating current to an exciting coil. However, since the voltage in a coil is not always proportional to a supplied power, a supplied power cannot be precisely controlled in Okabayashi et al. Moreover, since the current is detected after the AC power supply current is

rectified, it is impossible to control the current so that the current does not exceed the upper limit of the current determined in accordance with the standard without being affected by the variation of the voltage of the AC power supply.

Matsuo et al. features in Figure 1 the AC power supply 105 being connected to the rectifier 110. The current or peak value in a coil of a resonance circuit connected to the rectifier 110 is detected by the current peak detecting circuit 129. However, in Matsuo et al., a voltage detection circuit is not disclosed and, is in fact, unnecessary. It is unnecessary because the voltage in a resonance circuit is not always proportional to the supplied heater power. Moreover, since the current is also detected after the AC power supply current is rectified, it is also impossible to control the current so that the current does not exceed the upper limit of the current determined in accordance with the standard without being affected by the variation of the voltage of the AC power supply.

Kinouchi et al. is directed to an induction heating fixing apparatus and discloses that a current across an AC power supply line is detected in a current detecting section 103 and a voltage after the rectification is detected in a voltage detecting section 131. However, even though it may be assumed that the coil 40 corresponds to a heater, an assumption Applicant does not necessarily agree with, Kinouchi et al still fails to teach or suggest the advantages of Applicant's invention characterized by the detection of a current supplied from an AC power supplied to the full-wave rectifying means, detecting a voltage applied to the heater, and controlling the switching converter on the basis of the current value detected by the current detecting means and the voltage value detected by the voltage detecting means.

The aforementioned three characteristics of Applicant's invention are likewise

neither taught nor suggested by Okabayashi et al. or Matsuo et al.

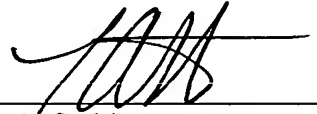
For the foregoing reasons, Applicant respectfully submits that each of independent claims 1 and 11 is distinguishable over the applied art. The remaining claims in the above application are dependent claims which depend either directly or indirectly from one of the above-discussed independent claims and are therefore patentable over the art of record for reasons noted above with respect to the independent claims. In addition, each recite features of the invention still further distinguishing it from the applied art. Favorable and independent consideration thereof is respectfully sought.

Applicant respectfully requests entry of the above amendments after final as they are being presented in an earnest effort to advance prosecution and place the application in condition for allowance. These amendments were not previously presented as Applicant had been of the firm belief that the claims on file were allowable over the art of record.

Applicant respectfully submits that this application has been placed in condition for allowance. Favorable reconsideration and early passage to issue of the above application are respectfully sought.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'L. Stahl', written over a horizontal line.

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